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# THE AMERICAN SOCIETY of HEATING and VENTILATING ENGINEERS

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## SEMI-ANNUAL PROGRESS REPORT

PROJECT: THE DESIGN AND CONSTRUCTION OF A HUMAN CALORIMETER  
CONTRACT NO. N8 onr 64902

PERIOD: JULY 1 to DECEMBER 31, 1952.

SUBMITTED: January 15, 1953

*John D. P. - Plan of Design*

### Calorimeter

Further test work has been carried out upon the Calorimeter including the ventilatory air circuit. In some of this work the Laboratory staff enjoyed the active participation of Dr. T. H. Bensinger and Dr. Charlotte Kitsinger of the NBSI, NMRC.

The Calorimeter performance was observed with both sensible heat and latent plus sensible heat inputs. The results were very encouraging and showed that the original objectives could be realized. As expected, however, a number of malfunctions were observed. These were of three types; variation in output level with constant load, lack of zero output at no load and error in measuring the applied load.

The first item led to an intensive investigation of the performance of the liquid supply circuits, controller and air saturator. A number of minor changes effected a major improvement in stability of output.

Lack of zero output with no load can easily be corrected by a number of adjustments that are readily available.

The measurement error resolves into a matter of calibration. The present calibration constants were obtained during the test runs; further tests will more accurately establish these values. For the purpose of investigating this matter more thoroughly the respiratory circuit plate meters will be constructed somewhat differently than the present ventilatory plate meters.

### Respiratory Air Circuit

Fabrication of the heat metering layers for the plate meters has been started and will soon be completed. The plate meter water plates have been fabricated and will be delivered shortly. The insulating enclosures for housing the plate meters, as well as the saturator and its enclosure, have been completed.

The form of the plate meter and saturator supply circuits has been established. A supply of liquid at 195 F and one at 20 F forms part of these requirements.

These supply systems, comprising four pumps, a 6kw electric immersion heater, two 15 gallon range boilers, solenoid valves and thermostats have been mounted, piped, wired and are now complete.

The required control functions will be obtained by three thermocouple input, pneumatic recorder controllers that are now on hand. The control of the liquid temperatures in the circuits is to be obtained by nine pneumatic control valves, also on hand.

A three H.P. air compressor has been obtained for use with the control equipment. Four pumps and a small heat exchanger for the circuit liquid supplies have been received.

A comprehensive layout drawing showing the location and piping of the complete respiratory equipment is now under preparation.

Efforts are being concentrated on completing the assembly of the equipment, so that preliminary tests can be made at Cleveland prior to the dismantling of the equipment and shipping it to the N.M.R.I., Bethesda.